Executive Summary

The monitoring and reporting requirements for the City of San Diego (City) Point Loma Wastewater Treatment Plant (PLWTP) are outlined in NPDES Permit No. CA0107409 and Monitoring and Reporting Program No. R9-2002-0025. The main objectives of the Point Loma ocean monitoring program is to assess the impact of wastewater discharged through the Point Loma Ocean Outfall (PLOO) on the marine environment off San Diego, provide data that satisfy NPDES permit requirements, demonstrate compliance with the 2001 California Ocean Plan (COP) as specified in the permit, monitor dispersion of the waste field, and identify any environmental changes that may have occurred. Specifically, the program was designed to assess the effects of wastewater discharge on ocean water quality, sediment conditions and marine organisms. The study area is centered around the PLOO discharge site, which is located approximately 7.2 km offshore of the treatment plant at a depth of nearly 100 m. Monitoring at sites along the shore extends from Mission Beach southward to the tip of Point Loma, while offshore monitoring occurs in an adjacent area overlying the coastal continental shelf at sites ranging from 9 to 116 m in depth.

Prior to the initiation of wastewater discharge through the extended outfall in late 1993, the City conducted a 2½-year baseline study designed to characterize background environmental conditions in the Point Loma region in order to provide information against which post-discharge data could be compared. Additionally, each year the City also typically conducts a region-wide survey of benthic conditions at randomly selected sites from Del Mar to the Mexico border as part of NPDES requirements for the South Bay Water Reclamation Plant. Both of the above types of studies are useful for evaluating patterns and trends over a broader geographic area, thus providing additional information to help distinguish reference areas from sites impacted by anthropogenic influences. The results of the 2006 annual survey of randomly selected stations throughout San Diego are presented in City of San Diego (2007).

The receiving waters monitoring effort for the Point Loma region is divided into several major components, each comprising a separate chapter in this report: Oceanographic Conditions, Microbiology, Sediment Characteristics, Macrobenthic Communities, Demersal Fishes and Megabenthic Invertebrates, and Bioaccumulation of Contaminants in Fish Tissues. Data regarding physical and chemical oceanographic parameters are evaluated to characterize water transport potential in the region. Water quality monitoring along the shore and in offshore waters includes the measurement of bacteriological indicators to assess natural and anthropogenic impacts. Benthic monitoring includes sampling and analysis of soft-bottom macrofaunal communities and associated sediments, while demersal fish and megabenthic invertebrate communities are the focus of trawling activities. The monitoring of fish populations is supplemented by bioaccumulation studies to determine whether or not contaminants are present in the tissues of "local" species. In addition to these activities, the City supports other projects relevant to assessing ocean quality in the region (see Chapter 1).

This report focuses on the results of ocean monitoring activities conducted off Point Loma during calendar year 2006. A general overview and summary of the main findings for each major monitoring component are included below.

Analysis of the receiving waters monitoring data off San Diego indicates that the PLOO has had only a limited effect on the local marine environment after 13 years of wastewater discharge at the present location. For example, water samples collected at sites within the Point Loma kelp bed were 100% compliant with 2001 COP bacterial water-contact standards in 2006. Compliance with COP standards was also very high along the shore, with all but one station being 100% compliance throughout the year. The one exception (95% compliance) occurred at a station located near the mouth of the San Diego

River, and exceedences at that site were related to stormwater runoff in March, the wettest month of the year. Elevated bacterial concentrations that could be attributable to wastewater discharge were mostly limited to depths of 60 m or below. The single sample from shallower waters that was indicative of contaminated water occurred south of Point Loma and was likely related to non-outfall sources. In addition, there was no evidence that the waste field from the outfall reached or affected any shoreline station in 2006, which is the same as that observed ever since the outfall was extended in 1993. An analysis of long-term data from 1991 through 2006 also shows a significant decline in bacteriological densities over time both along the shore and in the Point Loma kelp beds. There has also been no evidence of change in any physical or chemical water quality parameter (e.g., dissolved oxygen, pH) that can be attributed to wastewater discharge off Point Loma. Instead, changes in these parameters have historically been associated primarily with natural events such as storm activity and the presence of plankton blooms. Finally, drought conditions that began in late 2005 continued into 2006, which resulted in greatly reduced stormwater runoff or other inputs to coastal waters (e.g., river flows) during the year. Consequently, fewer sediment plumes were observed relative to the 2005 rain season with PLOO ocean waters generally appearing clearer throughout 2006.

Benthic conditions off Point Loma continued to show some changes in 2006 that may be expected near large ocean outfalls, although these were restricted to a relatively small, localized region near the discharge site. For example, sediment quality data have indicated slight increases over time in terms of sulfide and BOD concentrations at sites nearest the Zone of Initial Dilution (ZID), an area where relatively coarse sediment particles have also tended to accumulate. However, other measures of environmental impact such as concentrations of sediment contaminants (e.g., trace metals, pesticides) showed no patterns related to wastewater discharge. For example, concentrations of trace metals in Point Loma sediments were lower in 2006 than during the previous year. Some descriptors of benthic community structure (e.g., abundance, species diversity) or indicators of environmental disturbance (e.g., brittle star populations) have shown temporal differences between reference areas and sites nearest the ZID. However, results from environmental disturbance indices such as the BRI that are used to evaluate the condition of benthic assemblages suggest that macrobenthic invertebrate communities in the Point Loma region remain characteristic of natural conditions. Analyses of bottom dwelling (demersal) fish and trawl-caught megabenthic invertebrate communities also reveal no spatial or temporal patterns that can be attributed to effects of wastewater discharge. Instead, a review of historical data (1991−2006) indicates that patterns of change in fish assemblages appear related to large-scale oceanographic events (e.g., El Niño conditions in 1998) or specific site locations (e.g., near dredge material disposal sites). The paucity of pathological evidence from local fishes and the results of bioaccumulation studies also suggest that local fish assemblages remain healthy and are not adversely affected by wastewater discharge or other anthropogenic inputs. Consequently, there is currently no evidence of significant long-term negative impacts on water quality, sediment quality, or biotic communities in the coastal waters off San Diego.

LITERATURE CITED

City of San Diego. (2007). Annual Receiving Waters Monitoring Report for the South Bay Ocean Outfall (South Bay Water Reclamation Plant), 2006. City of San Diego Ocean Monitoring Program, Metropolitan Wastewater Department, Environmental Monitoring and Technical Services Division, San Diego, CA.